stormy weather prevailed, heavy rains occurring on the 17th and 18th, on the 22d and 23d, and on the 28th, with local rains on all other days between the dates given. The storm of the 15th was followed by a fall of 16° to 21° in temperature throughout the state.

The mean temperature was 49°.8, 0°.7 above the average, and 0°.48 below the mean for the state. The mean temperature for the northern section shows the influence of the Lakes, the figure being 46°.8, as against 50°.1, and 51°.8 for the middle and southern sections, respectively. The mean daily range of temperature was rather high, being 24°.5, 2°.7 above the average.

The mean rainfall was 3.83 inches, 0.9 inch above the average and 0.24 above the mean. The average depth for the northwestern section was 2.35 inches, for the middle section 3.56, and for the southern section 5.81. The greatest rainfall was 8.28 inches at Georgetown, the least, 1.13, at Oberlin.

Mean temperature, 49°.8; highest temperature, 90°.0, on the 12th and 13th, at Pomeroy; lowest temperature, 10°.0, on the 19th, at Findlay; range of temperature, 80°.0; mean daily range of temperature, 24°.5; greatest daily range of temperature, 57°.0. on the 11th, at Findlay; least daily range of temperature, 1°.0, on the 16th, at Wooster.

Average number of clear days, 10.2; average number of fair days, 12.9; average number of cloudy days, 6.9; average number of days on which rain fell, 9.4. Greatest number of days on which rain fell, 18, at Ellsworth; least number of days on which rain fell, 5, at New Bremen. Mean monthly rainfall, 3.83 inches; average daily rainfall, 0.128 inch.

Prevailing direction of wind, southwest.

The "South Carolina Weather Service," Hon. A. P. Butler, Commissioner of Agriculture for South Carolina, director:

The mean temperature of the month was slightly below the normal; while there were several warm days, notably the 11th, 12th, and 13th (when the maximum temperature ranged from 85° to 94°) the nights and mornings were generally cool. At Charleston the mean temperature was 62°.6, or 1°.7 below the mean of the last sixteen years.

The rainfall was also below the average, and was rather unevenly distributed, the central counties and the immediate coast districts receiving the greatest amounts. At Charleston the total precipitation was 3.53 inches, or 0.92 inch less than the average of the last sixteen years.

Heavy frost, causing some damage to fruit and vegetables, occurred throughout the state on the 2d. Frost also occurred in the upper and middle counties on the 1st, 3d, 6th, 9th, and 26th, and in the upper counties only on the 5th, 10th, 11th, 20th, 21st, 25th, 27th, and 30th.

Summary.

Mean temperature, 62°.3; highest temperature, 94°, at Winnsborough, and at Bennettsville, on the 12th; lowest temperature, 28°, at Winnsborough, on the 2d, and at Spartanburg, on the 6th; range of temperature, 66°; greatest daily range of temperature, 45°, at Brewer Mines, on the 11th; least daily range of temperature, 2°, at Stateburg on the 1st.

Mean depth of rainfall, 2.09 inches; greatest monthly rainfall, 4.47 inches, at Bennettsville, Marlborough Co.; least monthly rainfall, 0.79 inch, at Holland's Store, Anderson Co.; greatest daily rainfall, 1.90 inches, at Charleston, on the 1st; date of heaviest general rainfall throughout the state, 25th.

Rainfall exceeding one inch was reported as follows: Belfast, 1.73 inches, on the 15th; Bennettsville, 1.07 inches, on the 20th; Belfast, 1.37 inches; Bennettsville, 1.10; Hampton 1.10, on the 25th. Least daily rainfall, inappreciable, at several stations, on the 1st. Average number of rainy days, 5.4.

The "Tennessee State Board of Health Bulletin," under the direction of J. D. Plunkett, M. D., President of the State Board of Health (the weather report is prepared by H. C. Bate, Director of the State Meteorological Service):

The principal features for April were the high winds which prevailed at intervals during the month, severe thunder-storms, and the very small amount of rainfall during the first part of the month.

The mean temperature was 59°.13, slightly above the mean of the month for the past five years. The highest recorded was 93°, on the 8th, and was the highest reported in April during the past five years. The lowest was 21°, on the 5th, and was very near the mean minimum for the period above mentioned.

The mean precipitation was 2.86 inches, the least for April during the past five years, except in 1885, when the mean was 2.75 inches, much below the normal for April. The amount was greatest in the eastern division, which received an average of nearly four inches; the middle division receiving an average of nearly two and a half inches, and the western division but little over two inches.

The rainfall was heaviest in the extreme northeastern portion of the state; the greatest being 5.76 inches, reported at Rogersville. The day of the greatest rainfall was the 22d, when the fall was very heavy in the eastern division, particularly in the southwestern portion; Parksville reporting 2.47 inches, and Chattanooga 2.36 inches, the greatest local daily falls reported. Most of the rains, however, were light, and only a few were general, notably on the 4th, 7th, 17th, 18th, 22d, and 27th. From the 17th to the 28th, inclusive, rains were frequent, but mostly light and local. There were twelve days on which no rain was reported. There was no snowfall reported during the month.

There were two cold-wave warnings received and distributed: 3d–5th and 23d–24th; the predictions of both being fully verified.

Dews were reported on about ten days during the month. Although dry during the early part of the month, the frequent showers during the latter portion had a very beneficial effect on vegetation, which advanced rapidly toward perfection.

Summary.

Mean temperature, 59°.13; highest temperature, 93°, on the 8th, at Dyersburg; lowest temperature, 21°, on the 5th, at Andersonville; range of temperature, 72°; monthly mean range of temperature, 56°; greatest monthly range of temperature, 66°, at Andersonville and Hohenwald; least monthly range of temperature, 44°, at Covington; mean daily range of temperature, 21°.6; greatest daily range of temperature, 44°, on the 2d, at Hohenwald; least daily range of temperature, 3°, on the 17th, at Rogersville, on the 18th, at Covington, and on the 27th, at Florence Station and Vernon; mean of maximum temperatures, 87°.13; mean of minimum temperatures, 30°.83.

Mean depth of rainfall, 2.86 inches; mean daily rainfall, 0.095 inch; day of greatest rainfall, 22d.

Average number of days on which rain or snow fell, 7.3; average number of clear days, 16.8; average number of fair days, 8.1; average number of cloudy days, 5.1.

Days without rainfall, 1st, 2d, 3d, 5th, 6th, 9th to 14th, 30th.

Warmest day, 13th; coldest days, 1st and 15th.

Prevailing wind, southwest.

NOTES AND EXTRACTS.

RAIN FREQUENCY AND WIND ROSE FOR APRIL.

[Prepared by 1st Lieut. H. H. C. DUNWOODY, 4th Artillery, Acting Signal Officer and Asst.]

Chart number vii, for April, shows the relative frequency of rain at the principal stations, the reduced scale of the chart rendering it impossible to represent diagrams from all stations, and therefore only stations were selected which would indicate the general character of rain-winds for each district. The original data from which these charts were computed consist of the number of rains preceded by winds from the eight points of the compass for which wind is reported, and by calms, the record covering the entire time of Signal Service observations. To illustrate the manner of constructing the diagrams for each station, the process followed is given for Lynchburg Va.; at this station during April for a period of fifteen years rain was preceded by winds from the several directions, and by calms, as follows:

	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm.
Number of times rain was preceded by winds	3	38	12	5	32	21	10	11	20
Normal for April, based on fifteen years' data	0.2	2.5	0.8	0.3	2.1	1.4	0.7	0.7	1.3

The normal values, as given in the above table, for April were laid off on lines, drawn from the station as a centre, indicating the eight directions, the scale being one-fourth of an inch for one rain. The extremities of the lines thus laid off were then connected by right lines, thus forming the diagram for each station. The normal obtained for winds preceded by calms is represented by a circle, the radius of which is determined by the number of rains preceded by calms—one rain being equal to one-fourth of an inch. The scale used in the construction of the diagram is limited, owing to the reduced scale of the map. It should be remembered that these diagrams do not represent directly the actual amount of rainfall at any station, but they show the frequency of rains occurring at any station, and therefore the dimensions indicate indirectly the amount of the rainfall, as will be seen on examining the diagrams on the chart showing the regions of greatest and least rainfall. In the eastern portion of the United States the greatest number of rains are preceded by winds in the southeast quadrant. Some exceptions to this rule, probably due to local cause, will be observed in the Lake region. At several of the Rocky Mountain stations the greatest number of rains are preceded by northerly winds, while the wind chart shows that the prevailing winds in this region are southerly. Over the plateau regions and on the Pacific coast the rain-winds are southerly—generally from south to west.

Chart number viii shows the relative frequency of winds at the several stations of the Signal Service for the month of April from the opening of observation to 1886. The diagrams are constructed in a manner similar to that used in the construction of those on chart number vii, except that the scale used was one-fortieth of an inch for one wind. For example, the data for Lynchburg, Va., during April for a period of fifteen years are as follows:

	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm.
Number of times the wind blew	35	224	95	57	183	189	141	195	233
Normal based on fifteen years' data	2.3	14.9	6.3	3.8	12.2	12.6	9.4	13.0	15.5

The rain and dry wind charts and data relative thereto previously issued by the Signal Service were incomplete, as they generally represented only quadrants, each quadrant being determined by the greatest or least number of rains occurring in each during the time covered by the observations. This method of representing the rain-winds was incomplete, as winds blowing from one-half of the circle are, of necessity, neglected, and I have, therefore, prepared a series of charts, one for each month, which indicate for each station the frequency of rain from any direction for the month, and also the relative frequency of rain from the several directions of wind observed.

Charts number vii and viii were prepared for use in the Indications Room, where a graphic representation of data is necessary, and it is believed that they will be found of value in the preparation of the current weather predictions of the service.

DROUGHTS IN KANSAS AND TEXAS AND SECULAR VARIATION IN RAINFALL.

[Prepared by Junior Prof. H. A. HAZEN, Signal Service.]

From month to month for more than a year reports have come in of a great lack of rain and consequent drought in Kansas and Texas. In some instances fears have been expressed lest there has been entered upon a period of more or less permanent diminution in rainfall for this region. A careful investigation of this question was ordered by the Chief Signal Officer of the Army, and has resulted as follows:

The subject has already received attention at the hands of C. A. Schott, who decided in 1876 that up to that time there had been a slow and steady increase of precipitation since the earliest authentic records, which go back to about 1837. He also thought that probably the maximum or turning point had been reached and that there would be some diminution from that time on.

In 1883 an investigation of this question by the present writer showed a diminution of precipitation in 1879, but a marked increase for the three succeeding years. In the fifth biennial report of the Kansas State Board of Agriculture, p. 176, there is a paper entitled "Studies of rainfall in Kansas, as affecting climate," in which the writer, after a discussion of observations at Fort Leavenworth since 1837, and at Lawrence and Manhattan for shorter periods, says: "Extremes follow each other in regular sequence. We have had no more than two or three dry or wet years in succession. * * * We may fairly claim that Kansas climate is becoming more and more favorable. We may expect in the future, as in the past, wet seasons and dry seasons. We find often that these alternate year by year, and if the change is not annual, we have two, three, or four years of excessive rains followed by an equal period when the rainfall is below the average." A writer in the Coast Review thinks that a more or less severe drought occurs every seven years in the Missouri Valley. He notes a severe drought in 1860, a mild one in 1867, a severe one in 1874, and one less severe in 1881. A comparison of the precipitation for these years with the average for all the years shows that it was less. We may conclude that, in general, a marked deficiency in precipitation in any year has a tendency to drought, though this is varied largely by the distribution of rain and the temperature. A less fall in winter does not affect the crops if an average amount falls during the growing season.

On a comparison of the rainfall during the growing season of 1886, for Kansas and Texas, we find a marked deficiency. The rainfall for this year shows the following deficiencies: Omaha, —13 inches; Leavenworth, —12 inches; Dodge City, —2 inches; Fort Sill, —12 inches; Fort Davis, —6 inches; Galveston, —9 inches. It will be understood that the deficiency of 2 inches at Dodge City means more than the same would at Leavenworth, as the total precipitation is only about half at the former, as compared with the latter. Instances of as small a precipitation at Leavenworth back to 1837, are as follows: 1864, —19 inches; 1860, —15 inches; 1847, —14 inches; 1848, —19 inches. Taking the mean of each five years we find the following values and deficit or excess:

Pentacle.	Mean.	Defect or excess.	Pentacle.	Mean.	Defect or excess.
	Inches.	*Inches.*		*Inches.*	*Inches.*
1837-'41	31.42	—3.10	1867-'71	38.83	+4.31
1842-'46	29.32	—5.20	1872-'76	38.66	+4.14
1847-'51	33.35	—1.17	1877-'81	41.11	+6.59
1852-'56	31.28	—3.24	1882-'86	35.58	+1.06
1857-'61	35.37	+0.85			
1862-'66	30.34	—4.18	Mean	34.52	....

It should be noted that the period of observation is not sufficient to enable a perfectly satisfactory deduction, but it is plain that there has been a marked increase in precipitation during the last twenty years. The apparent falling off in the last five years is not unexpected, and does not indicate a permanent diminution, as it is mostly due to the small amount in 1886, and there have been four annual records previously, with a greater falling off than in 1886. We may conclude that the scarcity of rainfall in 1886 is not unprecedented, and that from past observations there is no proof of a permanent diminution in precipitation. Many more years' observations will be needed to establish a marked secular variation.

We may consider that opening up the land to tillage, planting trees, and general covering of many square miles with vegetation that were formerly barren wastes, has a tendency to retain the moisture from the clouds and this in turn renders the air slightly more humid, so that there has been an actual increase in the rainfall, and so long as these favoring influences continue there is no danger of a relapse to former conditions. A diminution for one or two years will be followed by an increase, and the average precipitation will continue or increase.

A proof of the general increase of moisture in the soil is given in the biennial report quoted above, in fact that, notwithstanding the increase of springs emptying into the water courses, there seems to be a tendency to a less flow of water in the streams. This seems to show a retention of moisture in the soil and a consequent increase of springs.

While this investigation applies more particularly to the eastern part of Kansas, because we have no long series of records either in western Kansas or Texas, yet from a comparison of rainfall records during the past fifteen years, we find that the fluctuations in these regions do not materially differ from those in the region here considered. The same principles here enunciated apply to Texas, except as modified by a less cultivation of the soil and a less covering of the surface by vegetation. Farmers in these regions need fear no permanent change in the climate for the present at least.

It is to be hoped that increased accuracy in observation and a larger number of observers reporting rainfall, clouds, and humidity will be had, so that in the near future we may have a still better basis for deductions regarding these very important elements. There should be intelligent voluntary observers in every county reporting to each state weather service.

COMPARISONS OF SIGNAL SERVICE BAROMETERS WITH STANDARD BAROMETERS IN EUROPE AND THE UNITED STATES.

[Abstract from report by Junior Prof. F. WALDO, Signal Service]

Comparisons of various standard barometers in Europe and the United States were made by Junior Prof. F. Waldo, of the Signal Service, and others, in the years 1882–1883, by means of portable barometers. The results of these and some subsequent barometer comparisons are given here.

The portable barometers used were syphon-barometers, of the form known as the Wild control-barometer, made by Fuess, of Berlin. The inside diameter of tube is 11 mm. The scales are graduated to millimeters on continuous brass, and are silvered. The mercury in open end of syphon is adjustable, by means of a screw at the bottom of the instrument, to the lower edge of an index which is movable. The lower edge of the index is made to coincide nearly with the zero of the scale graduation.

The lower indices of F. 141 and 152 were by accident slightly changed just before the comparisons at Kew. After the change the difference between Cent. Obs. Nor. and F. 141 is taken as —0.25 mm. instead of —0.30, which it was before, and the difference between Cent. Obs. Nor. and F. 152 as 0.00, instead of —0.11 mm.

Fuess Nos. 141, 150, and 152 were compared, at the Central Physical Observatory, Saint Petersburg, Russia, with Browning No. 44, a barometer reading on the Fortin principle. The observations were made in August, September, and December, 1882, by H. Wild, A. Bellikow, M. Rykatschew, Ed. Stelling, and B. Stresnewsky. Fuess No. 132 was compared with Browning No. 44 June, 12, 13, 14, and 15, 1883, by Ed. Stelling and F. Waldo. The correction of Browning No. 44 to reduce to Wild's normal barometer at the Central Observatory was known. The term normal applied to a barometer indicates its sources of errors have been investigated and allowed for in its readings. This normal barometer was very carefully and thoroughly investigated by Wild. It is a syphon tube of over one inch internal diameter. The graduation corections and coefficient of expansion of its scale were determined. Correction was made for the pressure of any slight amount of air the vacuum chamber contained, and for any slight deviation in density of the mercury with which it was filled from the density of pure mercury. It is observed by a cathetometer with two telescopes. The pointings with micrometer wires are made directly to the tops of the mercurial columns.

The following are the differences between this normal and the Fuess barometers:

	mm.
Cent. Obs. Nor. — F. 141 =	—0.30
" — F. 150 =	—0.20
" — F. 152 =	—0.11
" — F. 132 =	—0.09

After the changes in the lower indices of F. 141 and F. 152 at Kew the standing of these barometers was as follows:

	mm.
Cent. Obs. Nor. — F. 141 =	—0.25
" — F. 152 =	—0.00

In March, 1883, F. 150 was compared at Berlin with F. 76, the working standard of the Prussian Meteorological Service, by G. Hellman, with the following result:

	mm.
F. 76 — F. 150 =	—0.14
∴ Cent. Obs. Nor. — F. 76 =	—0.06

In March, 1883, F. 141, 150, and 152, were compared at Berlin with Fuess 38, belonging to the Normal Aichungs Kommission, by M. Thiesen and H. F. Wiebe. These, with the equation between Fuess 38 and the Fuess Normal, also belonging to the Normal Aichungs Kommission, give the following for the differences between those barometers and the Central Observatory Normal:

	mm.
Fuess 38 — F. 141 =	—0.28,
∴ Cent. Obs. Nor. — Fuess 38 =	—0.02;
Fuess 38 — F. 150 =	—0.14,
∴ Cent. Obs. Nor. — Fuess 38 =	—0.06;

Fuess 38 — F. 152 = —0.08,
∴ Cent. Obs. Nor. — Fuess 38 = —0.03;

Fuess Nor. — Fuess 38 = +0.20,

∴ Cent. Obs. Nor. — Fuess Nor. = —0.22;
∴ Cent. Obs. Nor. — Fuess Nor. = —0.26;
∴ Cent. Obs. Nor. — Fuess Nor. = —0.23;

April 27, 28, 30, and May 2, 3, 4, 5, 6, 1883, F. 141, 150, 152 were compared at Vienna with the standard barometer Pistor 279 of the Central Anstalt für Meteorologie und Erdmagnetismus, by St. Kostlivy, J. M. Pernter, and F. Waldo, with the following results:

mm.
Pistor 279 — F. 141 = —0.24,
∴ Cent. Obs. Nor. — Pistor 279 = —0.06;
Pistor 279 — F. 150 = —0.15,
∴ Cent. Obs. Nor. — Pistor 279 = —0.05;
Pistor 279 — F. 152 = —0.01,
∴ Cent. Obs. Nor. — Pistor 279 = —0.10.

June 30, July 2, 3, 1883, at Hamburg, F. 141, 150, 152, 132, were compared with Fuess 9 of the Deutsche Seewarte, by A. Sprung and F. Waldo. The same barometers were compared at the same place August 9th to 23d, 1883, after F. 141 and F. 152 had been taken to Kew and brought back. Another series of comparisons of the same barometers was made September 7th, 10th, 11th, 1883, after the journey to Paris. In the last two series the lower indices of F. 141 and F. 152 were in slightly different positions from what they were in the first series, due to change at Kew. The following are the results:

June–July, 1883.

mm.
Fuess 9 — F. 141 = +0.19,
∴ Cent. Obs. Nor. — Fuess 9 = —0.49;
Fuess 9 — F. 150 = +0.29,
∴ Cent. Obs. Nor. — Fuess 9 = —0.49;
Fuess 9 — F. 152 = +0.35,
∴ Cent. Obs. Nor. — Fuess 9 = —0.46;
Fuess 9 — F. 132 = +0.45,
∴ Cent. Obs. Nor. — Fuess 9 = —0.54.

August, 1883.

Fuess 9 — F. 141 = +0.24,
∴ Cent. Gbs. Nor. — Fuess 9 = —0.49;
Fuess 9 — F. 150 = +0.34,
∴ Cent. Obs. Nor. — Fuess 9 = —0.54;
Fuess 9 — F. 152 = +0.47,
∴ Cent. Obs. Nor. — Fuess 9 = —0.47;
Fuess 9 — F. 132 = +0.43,
∴ Cent. Obs. Nor. — Fuess 9 = —0.52.

September, 1883.

Fuess 9 — F. 141 = +0.22,
∴ Cent. Obs. Nor. — Fuess 9 = —0.47;
Fuess 9 — F. 150 = +0.32,
∴ Cent. Obs. Nor. — Fuess 9 = —0.52;
Fuess 9 — F. 152 = +0.43,
∴ Cent. Obs. Nor. — Fuess 9 = —0.43,
Fuess 9 — F. 132 = +0.44,
∴ Cent. Obs. Nor. — Fuess 9 = —0.53.

The mean of these values gives:

Cent. Obs. Nor. — Fuess 9 = —0.496.

In March, 1886, Prof. Neumayer found for the difference between Fuess 9 and the new normal barometer of the Seewarte by Fuess,

mm.
Seewarte Nor. Fuess — Fuess 9 = —0.454
∴ Cent. Obs. Nor. — Seewarte Nor. Fuess = —0.04

F. 141 and 152 were compared at Kew Observatory, England, with Newman 34 on July 28, 29, 30, 1883, by Mr. Foster and F. Waldo, with the following result:

mm.
Newman 34 — F. 141 = —0.08
Kew Normal — Newman 34 = —0.08
∴ Cent. Obs. Nor. — Kew Normal = —0.09
Newman 34 — F. 152 = +0.13
∴ Cent. Obs. Nor. — Kew Normal = —0.05

F. 141 and 152 were compared on August 30, 31, and September 1, 1883, at Sèvres, France, with barometers Fuess 137 and W. II (Turrettini) at the International Bureau of Weights and Measures. The equations between W. II and Normals I and II of the Bureau are known. The equation for F. 137 is not known.

Normal I is of nearly the same construction and is read in the same manner as Wild's normal at St. Petersburg. Normal II is also somewhat like Wild's, but is read differently. A collimating telescope is so arranged that an image of a set of coarse cross-wires is formed inside the barometer tube and at a distance of about 0.1 mm. above the surface of mercury. The micrometer wire of viewing telescope on cathetometer is read on the direct image of the cross wires and on their reflection from the surface of mercury. The mean of the two readings is taken as the reading of the top of the column of mercury. This method of observing, first used by Marek, is a most satisfactory way of observing accurately the position of a mercurial surface in a wide tube.

mm.
Fuess 137 — F. 141 = —0.08
∴ Cent. Obs. Nor. — Fuess 137 = —0.17
Fuess 137 — F. 152 = +0.20
∴ Cent. Obs. Nor. — Fuess 137 = —0.20
W II (Turrettini) — F. 141 = —0.19
Int. Bur. Nor. I — W II = +0.13
∴ Cent. Obs. Nor. — Int. Bur. Nor. I = —0.19
W II (Turrettini) — F. 152 = +0.08
∴ Cent. Obs. Nor. — Int. Bur. Nor. I = —0.21
Int. Bur. Nor. II — W II = +0.10
∴ Cent. Obs. Nor. — Int. Bur. Nor. II = —0.16
∴ Cent. Obs. Nor. — Int. Bur. Nor. II = —0.18

September 1, 2, 1883, F. 141 and F. 152 were compared with the standard Alvergniat barometer at the Central Meteorological Bureau at Paris, by F. Waldo. The equation between the Alvergniat barometer and Regnault's normal barometer, College de France, was known. The following are the results:

Alvergniat — F. 141 = —0.19
Regnault's Nor. — Alvergniat = —0.04
∴ Cent. Obs. Nor. — Regnault's Nor. = —0.02
Alvergniat — F. 152 = +0.05
∴ Cent. Obs. Nor. — Regnault's Nor. = —0.01

September 3, 1883, F. 141 and F. 152 were compared with the standard Fortin barometer at the Paris Astronomical Observatory, with the following results. The correction of attached thermometer of Fortin was found to be +0°.3:

Fortin — F. 141 = —0.39
∴ Cent. Obs. Nor. — Fortin = +0.14
Fortin — F. 152 = —0.14
∴ Cent. Obs. Nor. — Fortin = +0.14

On dates from Oct. 15 to Oct. 25, 1883, F. 152, 141, and 132 were compared by F. Waldo and T. Russell at the Signal Office, Washington City, with barometers Adie Nos. 1526, 1555, and Green Standard. The same barometers and also F. 150 were compared June 7, 9, 10, 11, 1884, by T. Russell and W. H. Hammon. The following are the results, no instrumental corrections being applied to Green Standard, Adie 1526, or the Fuess barometers:

October, 1883.

F. 152 — Green St'd. = —0.24
∴ Cent. Obs. Nor. — Green St'd. = —0.24
F. 141 — Green St'd. = +0.01
∴ Cent. Obs. Nor. — Green St'd. = —0.24
F. 132 — Green St'd. = —0.30
∴ Cent. Obs. Nor. — Green St'd. = —0.39

June, 1884.

F. 152 — Green St'd. = —0.38
∴ Cent. Obs. Nor. — Green St'd. = —0.38
F. 141 — Green St'd. = —0.10
∴ Cent. Obs. Nor. — Green St'd. = —0.35
F. 132 — Green St'd. = —0.27
∴ Cent. Obs. Nor. — Green St'd. = —0.36
F. 150 — Green St'd. = —0.19
∴ Cent. Obs. Nor. — Green St'd. = —0.39

The means of these give:

mm.
F. Waldo, October, 1883, Cent. Obs. Nor. — Green St'd. = —0.29
T. Russell, June, 1884, Cent. Obs. Nor. — Green St'd. = —0.37

Whenever Green Standard is used a correction of —0.004 in., equal to —0.10 mm. is applied to its readings. This is the amount by which the 30-inch mark of scale is less in distance than thirty inches above the ivory point in cistern. The difference then between pressures assigned by Cent. Obs. Nor. and Green Standard is —0.19 mm. according to F. Waldo, and —0.27 according to T. Russell, the Cent. Obs. Nor. being lower.

October, 1883.

mm.
F. 152 — Adie 1526 = —0.06
∴ Cent. Obs. Nor. — Adie 1526 = —0.06
F. 141 — Adie 1526 = +0.18
∴ Cent. Obs. Nor. — Adie 1526 = —0.07

June, 1884.

F. 152 — Adie 1526 = —0.25
∴ Cent. Obs. Nor. — Adie 1526 = —0.25